

ABSTRACT OF THE DISCLOSURE

A polycrystalline thin film of good quality is obtained by improving a crystallization process of a semiconductor thin film using laser light. After conducting a film forming step of forming a non-single crystal semiconductor thin film on a surface of a substrate, an annealing step is conducted by irradiating with laser light to convert the non-single crystal semiconductor thin film to a polycrystalline material. The annealing step is conducted by changing and adjusting the cross sectional shape of the laser light to a prescribed region. The semiconductor thin film is irradiated once or more with a pulse of laser light having an emission time width from upstand to downfall of 50 ns or more and having a constant cross sectional area, so as to convert the semiconductor thin film contained in an irradiated region corresponding to the cross sectional area to a polycrystalline material at a time. At this time, the energy intensity of laser light from upstand to downfall is controlled to apply a desired change. According to the procedures, a polycrystalline material having a large particle diameter or a uniform particle diameter can be obtained. In some cases, upon irradiation with laser light, the substrate may be maintained in a non-oxidative atmosphere, or may be heated or cooled.